2.4.4 Triticale variety trial - Perth, Tas

Location:
"Symmons Plains", Perth, Tasmania

Funding:
Southern Farming Systems

Researchers:
Geoff Dean, Brett Davey SFS/TIAR

Author: Geoff Dean

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Background/Aim:
Triticale has been recognised for its tolerance to waterlogging, better resistance to leaf and root disease and greater tolerance to acid soils compared with wheat. There are also perceived to be fewer difficulties associated with feeding of triticale grain to some livestock compared with wheat. However new strains have resulted in the breakdown of resistance to stripe rust in many triticale varieties and it is important to further assess disease responses, particularly as triticale is considered a low input crop.

The aim of this trial was to compare existing triticale varieties and evaluate new material with stripe rust resistance.

Summary of findings:
- Grain yields were affected by water-logging. Endeavour and Hawkeye were the top yielding varieties (5.0 and 4.7 t/ha respectively) but only Endeavour was significantly higher than Tahara. Endeavour has also yielded reasonably well in dual purpose trials but overall is yet to prove a worthy replacement for Breakwell.
- Yields of the new entries, Bogong and Yukuri, were disappointing as they tended to be lower yielding than Tahara.
- Only Endeavour and Yukuri proved fully resistant to stripe rust although the other varieties remained moderately resistant.

Trial information:
As a consequence of severe stripe rust in most varieties the number of triticale entries being evaluated has been significantly reduced. Bogong and Yukuri were evaluated in field trials in Tasmania for the first time.

Entries, their breeding program origin and seed licensee are listed below.
- Tahara: Vic DPI / various
- Hawkeye: AGT Seeds / AGT Seeds
- Endeavour: University of Sydney / Waratah Seeds
- Bogong: University of New England / Viterra Seeds
- Yukuri: University of New England/ Seed Distributors

The trial was sown on 18 May with 250kg/ha 9:13:14:3 and followed ryegrass. Plots were 1.5m wide and 10m long. The trial design was a randomised complete block with 4 replicates. The wet conditions delayed application of herbicides, fungicides and N. Urea was applied on 28 September (37 kgN/ha) and 20 October (46 kgN/ha). Due to the extended wet season three fungicides were applied. The first fungicide was applied to only two replicates to assess response to fungicide. However stripe rust soon became evident and to avoid the effect of highly susceptible lines reducing the grain yield of neighbouring plots as has occurred in the past, all four replicates received the latter two fungicides. The grain was harvested on 8 February 2011.

Growing season rainfall (Apr - Nov): 502 mm

Results and discussion:
The season: Early growth was good due to high soil moisture from above average rainfall in March/April. High rainfall in June (Decile 8 - 9) and follow up rains from July to September resulted in waterlogged conditions over the rest of winter and much of spring. Above average rainfall over November and December ensured a good finish to the season.

Endeavour and Hawkeye were the top yielding varieties but only the former was significantly higher yielding than Tahara (Table 1). Endeavour is a late, dual purpose variety and a replacement for Breakwell. Interstate reports of higher dry matter and grain yields than Breakwell (prior to its demise with stripe rust) have not yet been demonstrated in Tasmania. Endeavour, as with Breakwell, is tall and showed a small amount of lodging in the trial. Under good growing conditions it will likely require grazing or application of a PGR. Hawkeye is of mid season maturity and with shorter stature there was no lodging. Hawkeye is a spring type and not suitable for grain production from early sowing but has produced high dry matter in early sown forage-only trials. Bogong is an earlier maturing variety and was probably not favoured by the extended growing season. Yukuri, while being a later variety, may have greater potential as a fodder type.

Before stripe rust was controlled there was sufficient time to score varieties for susceptibility. Endeavour and Yukuri proved resistant whereas the other varieties were only moderately resistant but not susceptible as has occurred in other years. The rainfall and cooler weather in Nov/Dec were also conducive to development of stripe rust in the ear. This was particularly noticeable in Bogong and to a lesser degree in Tahara and Hawkeye. Grain yield did not relate to stripe rust infection with the resistant Yukuri yielding poorly.

Triticale is often prone to some ear loss but in 2010-11 this did not occur in any of the varieties. The triticale trial was grown adjacent to the main wheat variety trial at Symmons Plains and thus provides some comparison. There was little difference between yields, however the better wheat varieties tended to out-yield Endeavour even with all 4 replicates of triticale having received fungicide.

Table 1: Grain yields from triticale variety trial expressed as (t/ha) and as % of Tahara at Symmons Plains, Tasmania, 2010-11.

Variety	Yield (t/ha)	% Tahara
Endeavour	5.04	122.0
Hawkeye	4.73	114.6
Tahara	4.13	100.0
Bogong	3.96	96.0
Yukuri	3.82	92.4
F prob	**0.015**	
l.s.d. (5%)	**0.73**	

Summary:
It is quite remarkable that Tahara can still match newer triticale varieties (or an indicator of poor progress in breeding, at least for Tasmanian conditions). Although it is not fully resistant to stripe rust Tahara must have good multi-gene resistance to enable it to not succumb. It has proven difficult to select a new triticale variety that is consistently higher yielding than Tahara. This appears to be complicated by greater variety by site interaction as well as variety by year interaction, in comparison with wheat trials. There is also considerably lower funding for breeding compared with wheat resulting in less pyramiding or addition of resistance genes. If there are sufficient resources, further trials will be conducted in 2010-11 to validate the performance of Endeavour and Hawkeye and test new disease resistant material from other breeding programs.